

94EBR11

CLAIMS

- 1066097-013102
1. A process for recovering paraxylene from a C<sub>8</sub> aromatics stream containing paraxylene and at least one other isomer of xylene, ethylbenzene, or mixtures thereof which process comprises:
    - (a) recovering by means of a paraxylene separation process in a paraxylene recovery unit a portion of said paraxylene from at least a portion of said C<sub>8</sub> aromatics stream to produce a first stream having a reduced paraxylene content and containing a portion of said other isomers of xylene, said ethylbenzene, or mixtures thereof;
    - (b) passing at least a portion of said first stream directly or indirectly to a zeolite membrane unit comprising a zeolite membrane and optionally isomerisation catalyst under isomerization conditions, such that the permeate withdrawn through the zeolite membrane and from the zeolite membrane unit is enriched in paraxylene when compared to the feed to the zeolite membrane unit and
    - (c) feeding the permeate directly or indirectly back to the paraxylene separation process.
  2. A process as claimed in claim 1 wherein at least a portion of said first stream is subjected to an isomerisation process in an isomerisation unit to produce an isomerate having an enriched paraxylene content compared to that of first stream; and at least a portion of the isomerate is passed to the zeolite membrane unit.
  3. A process as claimed in claim 1 wherein the permeate withdrawn from the zeolite membrane unit is enriched in paraxylene compared to the equilibrium concentration of paraxylene in a xylenes equilibrium mixture.
  4. A process as claimed in claim 1 wherein the paraxylene recovery unit comprises a fractional crystallisation unit.
  5. A process as claimed in claim 1 wherein the paraxylene recovery unit comprises an adsorption separation unit.

6. A process as claimed in claim 1 wherein the paraxylene recovery unit comprises an adsorption separation unit in combination with a fractional crystallisation unit.
7. A process as claimed in claim 1 wherein the zeolite membrane unit isomerises metaxylene and orthoxylene to paraxylene.
8. A process as claimed in claim 1 wherein the zeolite membrane unit converts ethylbenzene to benzene and/or xylenes and/or C<sub>10</sub> aromatics.
9. A process as claimed in claim 1 wherein the zeolite membrane unit comprises a zeolite membrane which is active as an isomerization catalyst.
10. A process as claimed in claim 1 wherein the C<sub>8</sub> aromatics feed (fresh feed) is additionally or alternatively introduced to the process directly to the isomerisation unit, directly to the zeolite membrane unit or both.
11. A process for recovering paraxylene from a C<sub>8</sub> aromatics stream containing paraxylene and at least one other isomer of xylene, ethylbenzene, or mixtures thereof which process comprises:
  - (a) recovering by means of a paraxylene separation process in a paraxylene recovery unit a portion of said paraxylene from at least a portion of said C<sub>8</sub> aromatics stream to produce a first stream having a reduced paraxylene content and containing a portion of said other isomers of xylene, said ethylbenzene, or mixtures thereof;
  - (b) passing at least a portion of said first stream directly or indirectly to a zeolite membrane unit comprising a zeolite membrane and optionally isomerisation catalyst under isomerization conditions, such that the permeate withdrawn through the zeolite membrane and from the zeolite membrane unit is enriched in ethylbenzene compared to the retentate;
  - (c) subjecting at least a portion of said permeate to an ethylbenzene isomerisation process in an ethylbenzene isomerisation unit to produce an

94EBR11

isomerate having an enriched paraxylene content compared to that of the permeate;

(d) feeding the isomerate optionally combined with the retentate back to the paraxylene separation process.

12. A process as claimed in claim 11 wherein the isomerate from (c) optionally combined with the retentate is subjected to a further isomerisation process in a second isomerisation unit to produce a second isomerate having an enriched paraxylene content compared to the feed to the second isomerisation unit and feeding the second isomerate back to the paraxylene separation process.
13. A process as claimed in claim 11 which further comprises a zeolite membrane unit after (c) which produces a permeate enriched in paraxylene compared to the isomerate or second isomerate.
14. A process as claimed in claim 13 wherein the zeolite membrane unit introduced after (c) further comprises a xylenes isomerisation catalyst.
15. A process as claimed in claim 11 wherein there is present ethylbenzene isomerisation catalyst either as part of the zeolite membrane or downstream of the zeolite membrane but in close proximity to the membrane or both.
16. A process as claimed in claim 11 wherein the isomerisation catalyst in the zeolite membrane unit is located in close proximity to the membrane and on the permeate side of the membrane.
17. A process as claimed in claim 1 or 11 wherein the zeolite membrane unit comprises two or more alternating zones of catalyst and zeolite membrane.
18. A process as claimed in claim 1 or 11 wherein there are two or more zeolite membrane units with or without isomerisation catalyst arranged sequentially to each other.
19. A paraxylene recovery plant comprising:

94EBR11

(a) paraxylene recovery unit and

(b) a zeolite membrane unit comprising a zeolite membrane and optionally  
isomerisation catalyst.

20. A plant as claimed in claim 19 which further comprises an isomerisation  
unit.

21. A process as claimed in claim 1 which comprises a zeolite membrane  
which has been prepared by either the LAI-ISC, S-LAI-ISC or GEL-LAI-  
ISC processes.